

# IPv6, Mobile IP, and Ad Hoc Technologies in Aeronautical Telecommunications Network:

## Putting the Pieces Together

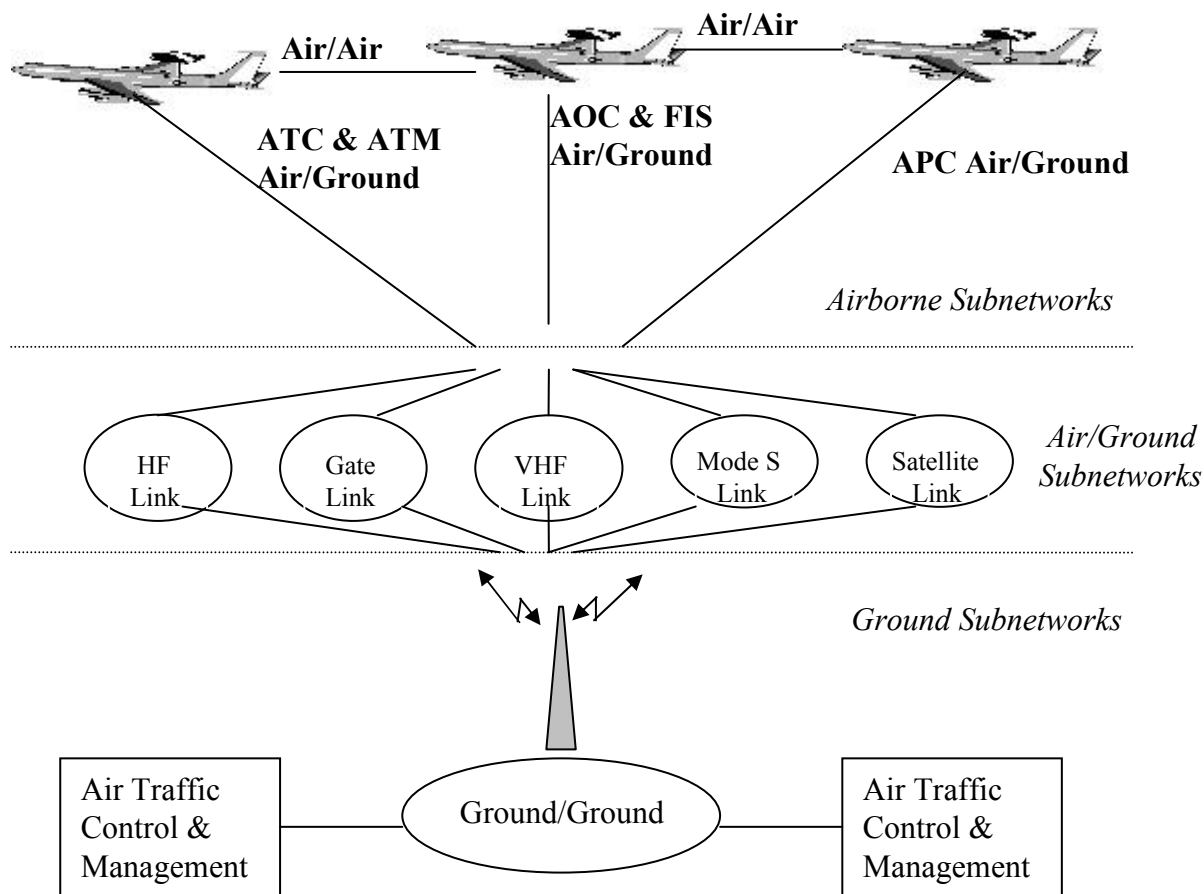
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- ATN Architecture
- ATN Requirements
- IPV6
- Mobile IP
- Ad hoc Networking
- The Full Picture

# ATN Architecture

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- ATC/ATM, requires air/ground (and ground/ground) communications.
- AOC, air/ground communications.
- FIS, air/ground communications.
- APC, air/ground communications.
- Future ATN, air/air communications.



# ATN Requirements

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- Security.
- Quality of Service.
- Routing and Addressing.
- Mobility Support.
- Multicast.
- Network Scalability.

## IPv6 (1/2)

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- IPv4 can not support ATN requirements (limited address space, lack of auto-configuration).
- IPv6, designed to resolve IPv4 limitations.
- IPv6 can support ATN requirements:
  - Security: IPSec as part of IPv6
  - QoS: Differentiated Services

## IPv6 (2/2)

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- Addressing: 128 bits
  - Auto-configuration: Stateless and Statefull to provide home address and CoA.
  - Mobility: Mobile IPv6 to provide tunneling between the HA and the MN/FA.
  - Scalability: More hierarchical routing supported by the large address space.
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# Mobile IPv6

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- Provides mobility support that includes:
    - The MN continues to receive packets in its visited network. This is done by associating a CoA with the MN in each visited network.
    - Transport connections should not break down as the node visits any foreign network. This is done by tunneling packets destined to the MN to its CoA in the visited network.
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# Ad hoc Networking (1/2)

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- Future ATN requires connectivity support among nodes regardless of their physical or logical location.
- Nodes should be able to organize themselves in an ad hoc architecture.
- This network is therefore called self-organizing ad hoc network.

## Ad hoc Networking (2/2)

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- Nodes in ad hoc networks should be able to automatically configure themselves.
  - Auto-configuration is needed when a node first joins the network and each time it visits a foreign network.
  - A node should continue to receive packets regardless of its location in the network.
  - Communication between ad hoc and fixed networks is required.
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# The Full Picture (1/2)

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- For ATN to fulfill its requirements it needs:
    - IPV6
    - Mobile IP
    - Ad hoc networking
  - IPv6 provides initial auto-configuration to ad hoc networks.
  - IPv6 provides dynamic auto-configuration (CoA) to Mobile IP.
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## The Full Picture (2/2)

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- Mobile IP provides the tunneling components to IPv6.
- Mobile IP provides routing between different ad hoc networks and ad hoc access to fixed networks.
- IPv6 provides static IP address to ad hoc nodes and dynamic CoA as they roam between different ad hoc networks.

# Questions